

KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Wednesday, March 30, 2016 10:55 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Jung-ho Kim (jhokim082@gmail.com); Andy Jiyong Oh; Christopher Tyree
Cc: Burja, Alexandra; Karas, Rebecca; Wunder, George; Umana, Jessica; Williams, Donna
Subject: APR1400 Design Certification Application RAI 454-8561 (09.01.01 - Criticality Safety of Fresh and Spent Fuel Storage and Handling)
Attachments: APR1400 DC RAI 454 SRSB 8561.pdf

KHNP,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

Jeff Ciocco
New Nuclear Reactor Licensing
301.415.6391
jeff.ciocco@nrc.gov



Hearing Identifier: KHNP_APR1400_DCD_RAI_Public
Email Number: 504

Mail Envelope Properties (ae49cc7130424e9c9481e2675ae16419)

Subject: APR1400 Design Certification Application RAI 454-8561 (09.01.01 - Criticality Safety of Fresh and Spent Fuel Storage and Handling)
Sent Date: 3/30/2016 10:54:42 AM
Received Date: 3/30/2016 10:54:43 AM
From: Ciocco, Jeff

Created By: Jeff.Ciocco@nrc.gov

Recipients:

"Burja, Alexandra" <Alexandra.Burja@nrc.gov>
Tracking Status: None
"Karas, Rebecca" <Rebecca.Karas@nrc.gov>
Tracking Status: None
"Wunder, George" <George.Wunder@nrc.gov>
Tracking Status: None
"Umana, Jessica" <Jessica.Umana@nrc.gov>
Tracking Status: None
"Williams, Donna" <Donna.Williams@nrc.gov>
Tracking Status: None
"apr1400rai@khnp.co.kr" <apr1400rai@khnp.co.kr>
Tracking Status: None
"KHNPDCDRAIsPEM Resource" <KHNPDCDRAIsPEM.Resource@nrc.gov>
Tracking Status: None
"JungHo Kim (jhokim082@gmail.com)" <jhokim082@gmail.com>
Tracking Status: None
"Andy Jiyong Oh" <jiyong.oh5@gmail.com>
Tracking Status: None
"Christopher Tyree" <Christopher.tyree@aecom.com>
Tracking Status: None

Post Office: HQPWMSMRS07.nrc.gov

Files	Size	Date & Time
MESSAGE	498	3/30/2016 10:54:43 AM
APR1400 DC RAI 454 SRSB 8561.pdf		116690
image001.jpg	5040	

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

REQUEST FOR ADDITIONAL INFORMATION 454-8561

Issue Date: 03/30/2016

Application Title: APR1400 Design Certification Review – 52-046

Operating Company: Korea Hydro & Nuclear Power Co. Ltd.

Docket No. 52-046

Review Section: 09.01.01 - Criticality Safety of Fresh and Spent Fuel Storage and Handling

Application Section:

QUESTIONS

09.01.01-35

In RAI 8190, Question 09.01.01-18, the staff noted lack of information in the Tier 1 material related to new and spent fuel storage racks (DCD Tier 1, Section 2.7.4). The response to RAI 8190, Question 09.01.01-18 provided a markup of the design description in Tier 1, Subsection 2.7.4.2 and Tables 2.7.4.1-1 and 2.7.4.2-1 as well as a markup of Tier 2, Table 14.3.4-6. The staff evaluated the applicant's responses and determined that, while the markups of the design description in Tier 1, Subsection 2.7.4.2 and Tier 2, Table 14.3.4-6 and the removal of the analysis portion of the ITAAC in Tier 1, Tables 2.7.4.1-1 and 2.7.4.2-1 are satisfactory, the applicant's approach for the ITAAC in Tables 2.7.4.1-1 and 2.7.4.2-1 is not consistent with established guidance on ITAAC, as described further below.

10 CFR 52.47(b)(1) requires that a DC application contain the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and should operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations.

In addition, based on the review of recent ITAAC submittals to the NRC, the staff identified four areas in which ITAAC could be improved in RIS 2008-05, "Lessons Learned to Improve Inspections, Tests, Analyses, and Acceptance Criteria Submittal," dated February 27, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073190162). RIS 2008-05, Revision 1 (ADAMS Accession No. ML102500244) expanded on these issues and identified several new issues. Additional information appears in Regulatory Guide (RG) 1.215, "Guidance for ITAAC Closure Under 10 CFR Part 52" (ADAMS Accession No. ML091480076), which endorses the methodologies described in the industry guidance document NEI 08-01, Rev. 3, "Industry Guideline for the ITAAC Closure Process Under 10 CFR Part 52," Rev. 3.

RIS-2008-05, Rev.1 identified that applicants:

- should clearly define all terms used in an ITAAC
- should avoid subjective terms, such as "inclined sufficiently," "acceptable level," and "adequate thickness"
- should avoid applying a single ITAAC to a large area of construction or to activities that are likely to be widely separated in time
- should consider the timing and sequence of construction activities in the development of related ITAAC
- should avoid expanding the ITAAC for functional arrangement of a system beyond the definition of functional arrangement as a physical arrangement of SSCs (it does not include testing, qualification, and analytical attributes)

REQUEST FOR ADDITIONAL INFORMATION 454-8561

For compliance with 10 CFR 52.47(b)(1) and for the clarity and completeness desired for the ITAAC closure process, the staff requests the applicant to update Tier 1 with respect to the following:

1. Design Commitment 2 in DCD Tier 1, Tables 2.7.4.1-1 and 2.7.4.2-1 states that “The spent fuel storage racks maintain the effective multiplication factor, K_{eff} , less than or equal to criticality limits during normal operation and the postulated accident conditions.” However, it is unclear what these “criticality limits” are. Please specify in Tier 1 and the ITAAC the regulatory limits in 10 CFR 50.68.
2. The markup of Acceptance Criteria 2.a and 2.b for Design Commitment 2 in DCD Tier 1, Tables 2.7.4.1-1 and 2.7.4.2-1 refers to as-built dimensions and materials being consistent with or conforming to those used in the criticality analysis. The staff notes that the criticality analysis assumes non-design values for a variety of parameters for the purposes of conservatism and/or sensitivity studies. For example, sensitivity studies in the criticality analysis vary rack dimensions and spacing. The analysis also assumes 75% of the design value of B-10 areal density in the neutron absorbing panels. If the new and spent fuel storage facilities were consistent with and conformed to these assumptions, they would not be built as designed. Therefore, please clarify in Tier 1 and the ITAAC that the dimensions and materials and their tolerances conform to design values, as shown to be acceptable in the approved criticality and seismic and structural analyses.
3. The markup of Acceptance Criterion 2.a for Design Commitment 2 in DCD Tier 1, Tables 2.7.4.1-1 and 2.7.4.2-1 refers to as-built dimensions for the racks, including center-to-center spacing, being consistent with those used in the criticality analysis and the structural and seismic analysis. The staff notes that, in addition to spacing within each rack, rack-to-rack spacing and rack-to-wall spacing are also important parameters for the criticality analyses. As such, please update the Tier 1 information and the ITAAC to consider not just dimensions within each rack, but the spacing between adjacent racks and between racks and walls.
4. The staff notes that inspection of associated documentation would be expected for the inspection, tests, and analyses in DCD Tier 1, Tables 2.7.4.1-1 and 2.7.4.2-1. Please update the Tier 1 information and ITAAC to include inspection of associated documentation.



U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment